

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 10 April 2001 (10.04.01)	
International application No. PCT/US00/19115	Applicant's or agent's file reference RCA89694
International filing date (day/month/year) 13 July 2000 (13.07.00)	Priority date (day/month/year) 16 July 1999 (16.07.99)
Applicant HUTCHINSON, Daniel, Mark et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 14 February 2001 (14.02.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

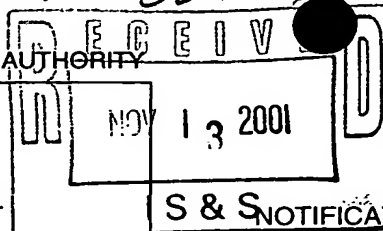
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Claudio Borton Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

EXPRESS EL 902321679 US

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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To:

KA/KA

TRIPOLI, Joseph S.
THOMSON MULTIMEDIA LICENSING INC.
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S & S NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing
(day/month/year)

23.10.2001

Applicant's or agent's file reference
RCA89694

IMPORTANT NOTIFICATION

International application No.
PCT/US00/19115

International filing date (day/month/year)
13/07/2000

Priority date (day/month/year)
16/07/1999

Applicant

THOMSON LICENSING S.A.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Event	PA
Deadline	16 NOV 2001
Entered	DPF 11/14/01

Final Country Selection
TO DAVID

Name and mailing address of the IPEA/



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Authorized officer

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PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference RCA89694	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 00/ 19115	International filing date (day/month/year) 13/07/2000	(Earliest) Priority Date (day/month/year) 16/07/1999
Applicant THOMSON LICENSING S.A.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

2
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 00/19115

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N5/52

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 09, 30 July 1999 (1999-07-30) & JP 11 098426 A (SAMSUNG ELECTRON CO LTD), 9 April 1999 (1999-04-09) abstract	1-22
P, A	US 5 982 457 A (LIMBERG ALLEN LEROY) 9 November 1999 (1999-11-09) column 1, line 19 - line 48 column 3, line 22 - column 4, line 20 column 7, line 21 - column 8, line 19 column 10, line 55 - column 11, line 8	1-22
A	& KR 9 870 192 A (SAMSUNG ELECTRONICS) 26 October 1998 (1998-10-26) the whole document	1-22

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

* & * document member of the same patent family

Date of the actual completion of the international search

28 November 2000

Date of mailing of the international search report

04/12/2000

Name and mailing address of the ISA

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Authorized officer

Berwitz, P

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/19115

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 659 372 A (PATEL C B ET AL) 19 August 1997 (1997-08-19) column 1, line 6 - line 9 column 15, line 24 - line 55; figure 11 ----	1-22
P,A	EP 0 944 255 A (ALPS ELECTRIC CO LTD) 22 September 1999 (1999-09-22) the whole document -----	1-22

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/19115

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 11098426 A	09-04-1999	CN 1211141 A	17-03-1999
US 5982457 A	09-11-1999	KR 247056 B US 6046781 A	15-03-2000 04-04-2000
US 5659372 A	19-08-1997	NONE	
EP 0944255 A	22-09-1999	JP 11261922 A	24-09-1999

EUROPEAN PATENT OFFICE

Patent Abstracts of Japan

PUBLICATION NUMBER : 11098426
PUBLICATION DATE : 09-04-99

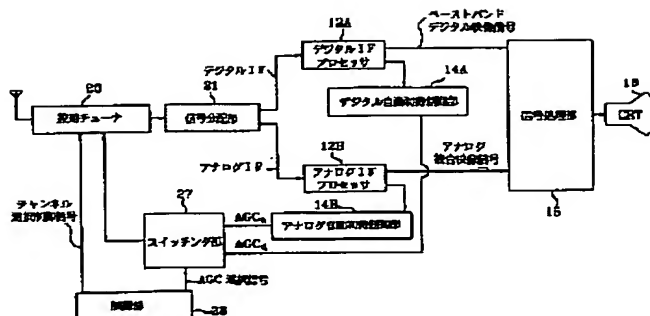
APPLICATION DATE : 10-07-98
APPLICATION NUMBER : 10195849

APPLICANT : SAMSUNG ELECTRON CO LTD;

INVENTOR : JO EICHIYU;

INT.CL. : H04N 5/44 H04B 1/16 H04N 5/52

TITLE : TELEVISION RECEIVER PROVIDED WITH TUNER IN COMMON USE FOR ANALOG/DIGITAL SIGNAL



ABSTRACT : PROBLEM TO BE SOLVED: To provide a television receiver that is able to receive both analog and digital broadcast signals and to process the received signals.

SOLUTION: A control section 28 applies a channel selection control signal depending on a broadcast system to a common use tuner 20 and applies an AGC selection signal depending on the broadcast system to a switching section 27. The common use tuner 20 selects a channel of the corresponding broadcast system in response to the received channel selection control signal and adjusts the gain of the selected channel with respect to an RF signal in response to the received automatic gain control signal and converts the result into an IF signal. A signal distribution section 21 selects the IF signal from the common use tuner 20 and provides an output of the selected signal. An analog processor 12B and a digital processor 12A decode an analog composite video signal and a base band digital video signal from the corresponding IF signal and generate automatic gain control signals depending on the decoded signal level to a switching section 27. The switching section 27 selects either of the received automatic gain control signals depending on the AGC selection signal received from the control section 28 and gives the selected signal to the common use tuner 20.

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EUROPEAN PATENT APPLICATION

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(30) Priority: 16.03.1998 JP 6517198

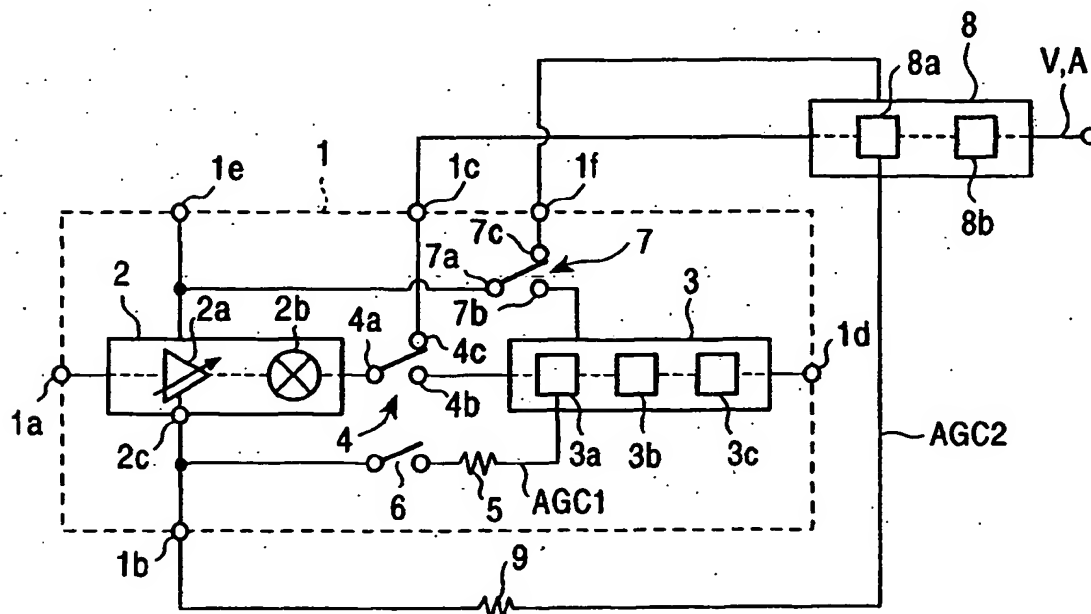
(71) Applicant: ALPS ELECTRIC CO., LTD.
Ota-ku Tokyo 145 (JP)

(54) Digital television tuner

(57) A first switching means (4) is provided between a tuning circuit (2) and a digital processor (3), and opening and closing means (6) is provided between a gain control terminal (28) and the digital processor. If a digital television tuner of the present invention receives a digital television signal method, the digital television tuner not only makes the first switching means input a first intermediate frequency signal, outputted from the tuning circuit, to the digital processor, but also makes the open-

ing and closing means supply a first gain control voltage to the gain control terminal. If this tuner receives an analog television signal analog method, the digital television tuner not only makes the first switching means lead a second intermediate frequency signal, outputted from the tuning circuit, to an output terminal of the second intermediate frequency signal, but also makes the opening and closing means prevent the first gain control voltage from being supplied to the gain control terminal.

FIG. 1



Description

[0001] The present invention relates to a digital television tuner receiving a television signal in a digital method, and in particular, to a digital television tuner that can receive also a television signal in an analog method.

[0002] Figure 2 is a block diagram for explaining a conventional digital television tuner. Here, a digital television tuner 21 comprises a tuning circuit 22 and a digital processor 23. A tuner input terminal 21a receives not only a television signal in a digital method (hereinafter, this is called a digital television signal) but also a television signal in an analog method (hereinafter, this is called an analog television signal). The tuning circuit 22 comprises a gain control amplifier 22a, a mixer 22b, and a local oscillator (not shown). Then, any one of the digital television signal and analog television signal that are inputted to the tuner input terminal 21a is selected inside the tuning circuit 22. After the selected signal is amplified by the gain control amplifier 22a, the selected signal is frequency-converted into an intermediate frequency signal in the mixer 22b by being mixed with a local oscillation signal outputted from the local oscillator, and is outputted.

[0003] Therefore, the tuning circuit 22 outputs an intermediate frequency signal based on the digital television signal (hereinafter, this is called a digital IF signal) or an intermediate frequency signal based on the analog television signal (hereinafter, this is called an analog IF signal). Here, a gain control terminal 22c to which a control voltage for controlling the gain of the gain control amplifier 22a is supplied is provided in the tuning circuit 22. This gain control terminal 22c is connected to a gain control voltage input terminal 21b of the digital television tuner 21.

[0004] A transfer switch 24 is provided between the tuning circuit 22 and digital processor 23. The transfer switch 24 has a common terminal 24a and two switched terminals 24b and 24c. The common terminal 24a is connected to an output terminal of the tuning circuit 22, and one switched terminal 24b is connected to an input terminal of the digital processor 23. In addition, another switched terminal 24c is connected to an analog IF signal output terminal 21c provided in this digital television tuner 21.

[0005] In addition, if the digital television tuner 21 receives a digital television signal, the common terminal 24a of the transfer switch 24 is connected to one switched terminal 24b, and a digital IF signal from the tuning circuit 22 is inputted to the digital processor 23. Furthermore, if the digital television tuner 21 receives an analog television signal, the common terminal 24a of the transfer switch 24 is connected to another switched terminal 24c, and an analog IF signal from the tuning circuit 22 is outputted to the analog IF signal output terminal 21c.

[0006] In addition, the digital processor 23 comprises a gain control voltage generator 23a, a mixer 23b, an

analog-digital converter 23c, and a local oscillator (not shown). The gain control voltage generator 23a generates a first gain control voltage (AGC1). This first gain control voltage (AGC1) changes within the range of about 5.5-0 volts, becomes large when a level of the digital television signal is low, and becomes small when high. In addition, the digital IF signal is frequency-converted into a frequency of several MHz in the mixer 23b by being mixed with a local oscillation signal from the local oscillator. Furthermore, the digital IF signal frequency-converted is converted into a digital signal (D) by the analog-digital converter 23c to be outputted to a tuner output terminal 21d. The first gain control voltage (AGC1) is supplied to the gain control terminal 22c of the tuning circuit 22 through a register 25 to control the gain of the gain control amplifier 22a.

[0007] In addition, a power supply voltage is supplied from a power supply terminal 21e to the tuning circuit 22 and digital processor 23.

[0008] On the other hand, if an analog television signal is received with using the above-described digital television tuner 21, an analog processor 26 that is provided separately from the digital television tuner 21 is used. In addition, a power supply voltage that is different from the power supply voltage supplied to the power supply terminal 21e of the digital television tuner 21 is supplied to the analog processor 26. Furthermore, a signal input terminal of the analog processor 26 is connected to the analog IF signal output terminal 21c of the digital television tuner 21. This analog processor 26 comprises a gain control voltage generator 26a, and a demodulator 26b, generates a second gain control voltage (AGC2) from the gain control voltage generator 26a, and further outputs a picture signal (V) and an audio signal (A) that are demodulated by the demodulator 26b. The second gain control voltage (AGC2) also changes within the range of about 5.5-0 volts, becomes large when a level of the analog television signal is low, and becomes small when high.

[0009] The second gain control voltage (AGC2) outputted from the analog processor 26 is supplied to the gain control voltage input terminal 21b of the digital television tuner 21 through a register 27. Then, the second gain control voltage (AGC2) supplied to the gain control voltage input terminal 21b in the digital television tuner 21 is supplied to the gain control terminal 22c of the tuning circuit 22. Owing to this, the gain of the gain control amplifier 22a of the tuning circuit 22 is controlled when the analog television signal is received.

[0010] In the conventional construction described above, even at the time of receiving an analog television signal, the power supply voltage is supplied to the digital processor 23, and hence the digital processor 23 is in an operating state. Therefore, the local oscillation signal is generated by the local oscillator in the digital processor 23. Hence, this local oscillation signal interferes the operation of the analog processor 26 by directly plunging into the analog processor 26 via a space. In addition,

this local oscillation signal is inputted to the analog processor 26 via a line where the register 25 supplying the first gain control voltage (AGC1) to the tuning circuit 22 is provided and via a line where the register 27 supplying the second gain control voltage (AGC2) to the tuning circuit 22 is provided. In consequence, this local oscillation signal similarly interferes the operation of the analog processor 26, which is a problem of the conventional digital television tuner.

[0011] In addition, when an analog television signal is received, a digital IF signal is not inputted although the power supply voltage from the power supply terminal 21e is supplied to the digital processor 23. Therefore, the first gain control voltage (AGC1) from the gain control voltage generator 23a of the digital processor 23 becomes the maximum value (nearly 5.5 volts). Hence, even if the second gain control voltage (AGC2) from the analog processor 26 becomes low since a level of the analog television signal becomes large, the first gain control voltage (AGC1) that is a high voltage is superimposed on the gain control terminal 22c of the tuning circuit 22 through the register 25. Therefore, the conventional digital television tuner has another problem that, since the voltage at the gain control terminal 22c becomes higher than the second gain control voltage (AGC2), accurate gain control cannot be performed.

[0012] Then, a digital television tuner of the present invention prevents the disturbance of the local oscillation signal, which is outputted from the digital processor 23, and also avoids the influence of the first gain control voltage (AGC1), which is outputted from the digital processor 23, to the second gain control voltage (AGC2).

[0013] In order to solve above problems, the digital television tuner of the present invention comprises: a tuning circuit that has a gain control amplifier amplifying a television signal in a digital method and a television signal in an analog method, and a gain control terminal to which a gain control voltage for controlling the gain of the gain control amplifier is inputted, and outputs a first intermediate frequency signal based on the television signal in the digital method or a second intermediate frequency signal based on the television signal in the analog method; a digital processor outputting a first gain control voltage by processing the first intermediate frequency signal; an output terminal of an analog intermediate frequency signal to which an analog processor outputting a second gain control voltage by processing the second intermediate frequency signal is connected; and a gain control voltage input terminal to which the second gain control voltage from the analog processor is supplied, wherein first switching means is provided between the tuning circuit and the digital processor; wherein opening and closing means is provided between the gain control terminal and the digital processor; wherein, if the digital television tuner receives a television signal in the digital method, not only the first switching means inputs the first intermediate frequency signal, which is outputted from the tuning circuit, to the

digital processor, but also the opening and closing means supplies the first gain control voltage to the gain control terminal; and wherein, if the digital television tuner receives an analog signal in the analog method, not only the first switching means leads the second intermediate frequency signal, outputted from the tuning circuit, to the output terminal of the analog intermediate frequency signal, but also the opening and closing means prevents the first gain control voltage from being supplied to the gain control terminal.

[0014] Preferably, a digital television tuner of the present invention prevents a power supply voltage from being supplied to the digital processor if the digital television tuner receives a television signal in the analog method.

[0015] Preferably, a digital television tuner of the present invention is characterized in that the tuning circuit has a first power supply terminal for supplying a power supply voltage to the tuning circuit, a second power supply terminal for supplying a power supply voltage to the analog processor, and second switching means, that, if the digital television tuner receives a television signal in the digital method, the second switching means supplies the power supply voltage, supplied to the first power supply terminal, to the digital processor, and that, if the digital television tuner receives a television signal in the analog method, not only the second switching means leads the power supply voltage, supplied to the first power supply terminal, to the second power supply terminal, but also the second switching means prevents the power supply voltage from being supplied to the digital processor.

[0016] Embodiments of the present invention will now be described by way of example only, with reference to accompanying diagrammatic drawings in which:

Figure 1 is a block diagram for explaining a digital television tuner of the present invention; and
Figure 2 is a block diagram for explaining a conventional digital television tuner.

[0017] Figure 1 is a block diagram for explaining a digital television tuner of the present invention. Here, a digital television tuner 1 comprises a tuning circuit 2 and a digital processor 3. A tuner input terminal 1a receives not only a television signal in a digital method (hereinafter, this is called a digital television signal) but also a television signal in an analog method (hereinafter, this is called an analog television signal). The tuning circuit 2 has a gain control amplifier 2a, a mixer 2b, a local oscillator (not shown), and the like. Then, any one of the digital television signal and analog television signal that are inputted to the tuner input terminal 1a is selected inside the tuning circuit 2. After the selected signal is amplified by the gain control amplifier 2a, the selected signal is frequency-converted into an intermediate frequency signal in the mixer 2b by being mixed with a local oscillation signal from the local oscillator, and is output-

ted.

[0018] Therefore, the tuning circuit 2 outputs an intermediate frequency signal based on the digital television signal (hereinafter, this is called a digital IF signal) or an intermediate frequency signal based on the analog television signal (hereinafter, this is called an analog IF signal). Here, a gain control terminal 2c to which a control voltage for controlling the gain of the gain control amplifier 2a is supplied is provided in the tuning circuit 2. This gain control terminal 2c is connected to a gain control voltage input terminal 1b of the digital television tuner 1.

[0019] First switching means 4 is provided between the tuning circuit 2 and digital processor 3. The first switching means 4 has a common terminal 4a and two switched terminals 4b and 4c. The common terminal 4a is connected to an output terminal of the tuning circuit 2, and one switched terminal 4b is connected to an input terminal of the digital processor 3. In addition, another switched terminal 4c is connected to an analog IF signal output terminal 1c provided in this digital television tuner 1.

[0020] In addition, if the digital television tuner 1 receives a digital television signal, the common terminal 4a of the first switching means 4 is connected to one switched terminal 4b, and a digital IF signal from the tuning circuit 2 is inputted to the digital processor 3. Furthermore, if the digital television tuner 1 receives an analog television signal, the common terminal 4a of the first switching means 4 is connected to another switched terminal 4c, and an analog IF signal from the tuning circuit 2 is outputted to the analog IF signal output terminal 1c.

[0021] In addition, the digital processor 3 comprises a gain control voltage generator 3a, a mixer 3b, an analog-digital converter 3c, and a local oscillator (not shown), and generates a first gain control voltage (AGC1) from the gain control voltage generator 3a. This first gain control voltage (AGC1) changes within the range of about 5.5-0 volts, becomes large when a level of the digital television signal is low, and becomes small when high. In addition, the digital IF signal is frequency-converted into a frequency of several MHz in the mixer 3b by being mixed with a local oscillation signal from the local oscillator. Furthermore, the digital IF signal frequency-converted is converted into a digital signal (D) by the analog-digital converter 3c to be outputted to a tuner output terminal 1d. The first gain control voltage (AGC1) is supplied to the gain control terminal 2c of the tuning circuit 2 through a register 5 and opening and closing means 6 to control the gain of the gain control amplifier 2a. This opening and closing means becomes open if the digital television tuner receives an analog television signal, and becomes close if a digital television signal.

[0022] In addition, a first power supply terminal 1e and a second power supply terminal 1f are provided in the digital television tuner 1. A power supply voltage is supplied from the external to the first power supply terminal

1e. The power supply voltage supplied to the first power supply terminal 1e is directly supplied to the tuning circuit 2 and is supplied to the digital processor 3 through second switching means 7. The second switching means 7 has a common terminal 7a, and two switched terminals 7b and 7c. The common terminal 7a is connected to the first power supply terminal 1e, and one switched terminal 7b is connected to the digital processor 3. In addition, another switched terminal 7c is connected to the second power supply terminal 1f. In this second switching means 7, the common terminal 7a is connected to one switched terminal 7b and the power supply voltage is supplied to the digital processor 3 if the digital television tuner 1 receives the digital television signal. Furthermore, if the digital television tuner 1 receives the analog television signal, the common terminal 7a is connected to another switched terminal 7c and the power supply voltage is outputted to the second power supply terminal 1f.

[0023] On the other hand, if an analog television signal is received with using the above-described digital television tuner 1, an analog processor 8 that is provided separately from the digital television tuner 1 is used. In addition, a power supply voltage is supplied from the second power supply terminal 1f of the digital television tuner 1 to the analog processor 8. In addition, an analog IF signal is inputted from an analog IF signal output terminal 1c of the digital television tuner 1. This analog processor 8 comprises a gain control voltage generator 8a and a demodulator 8b, generates a second gain control voltage (AGC2) from the gain control voltage generator 8a, and further outputs a picture signal (V) and an audio signal (A) that are demodulated by the demodulator 8b. The second gain control voltage (AGC2) also changes within the range of nearly 5.5-0 volts, becomes large when a level of the analog television signal is low, and becomes small when high.

[0024] The second gain control voltage (AGC2) outputted from the analog processor 8 is supplied to the gain control voltage input terminal 1b of the digital television tuner 1 through a register 9. Owing to this, the gain of the gain control amplifier 2a of the tuning circuit 2 is controlled when the analog television signal is received.

[0025] Owing to the above construction, if the digital television tuner 1 receives a digital television signal, the second switching means 7 supplies the power supply voltage to the digital processor 3, and the first switching means 4 inputs the digital IF signal, outputted from the tuning circuit 2, to the digital processor 3. Then, with closing the opening and closing means, the first gain control voltage (AGC1) generated from the gain control voltage generator 3a of the digital processor 3 is supplied to the gain control amplifier 2a of the tuning circuit 2.

[0026] At this time, since the power supply voltage is not supplied to the analog processor 8, the second gain control voltage (AGC2) based on the analog television

signal is not generated from the gain control voltage generator 8a, and its level is nearly 0 volts.

[0027] Therefore, the second gain control voltage (AGC2) is not superimposed on the first gain control voltage (AGC1), but only the first gain control voltage (AGC1) is supplied to the gain control amplifier 2a of the tuning circuit 2.

[0028] On the other hand, if the digital television tuner 1 receives an analog television signal, the second switching means 7 supplies the power supply voltage to the analog processor 8, and the first switching means 4 inputs the analog IF signal, outputted from the tuning circuit 2, to the analog processor 8. Furthermore, the second gain control voltage (AGC2) generated from the gain control voltage generator 8a of the analog processor 8 is supplied to the gain control amplifier 2a of the tuning circuit 2. At this time, with opening the opening and closing means 6, the gain control voltage generator 3a of the digital processor 3 is separated from the gain control terminal 2c of the tuning circuit 2.

[0029] Therefore, the first gain control voltage (AGC1) is not superimposed on the second gain control voltage (AGC2), but only the second gain control voltage (AGC2) is supplied to the gain control amplifier 2a of the tuning circuit 2.

[0030] In addition, if the digital television tuner 1 receives an analog television signal, the power supply voltage is not supplied to the digital processor 3, and hence the local oscillator (not shown) in the digital processor 3 does not operate. Therefore, since the local oscillation signal is not generated, the local oscillation signal does not interfere the operation of the analog processor 8.

[0031] Furthermore, if the digital television tuner receives a digital television signal, the power supply voltage is not supplied to the analog processor, but is supplied to the digital processor. Moreover, if the digital television tuner receives an analog television signal, the power supply voltage is not supplied to the digital processor, but is supplied to the analog processor added in the external, and hence power saving is planned.

[0032] As described above, in the digital television tuner of the present invention, the first switching means is provided between the tuning circuit and digital processor, and an opening and closing means is provided between the gain control terminal and digital processor. In addition, if the digital television tuner receives a digital television signal, not only the first switching means inputs the first intermediate frequency signal, which is outputted from the tuning circuit, to the digital processor, but also the opening and closing means supplies the first gain control voltage to the gain control terminal. Furthermore, if the digital television tuner receives an analog television signal, not only the first switching means leads the second intermediate frequency signal, outputted from the tuning circuit, to the output terminal of the analog intermediate frequency signal, but also the opening and closing means prevents the first gain control voltage

from being supplied to the gain control terminal. If the digital television tuner receives an analog television signal, the first gain control voltage is not superimposed on the second gain control voltage, but only the second gain control voltage is supplied to the gain control amplifier of the tuning circuit, and hence there is no influence of the first gain control voltage.

[0033] In addition, if the digital television tuner receives an analog television signal, the opening and closing means becomes open. Therefore, even if the local oscillator in the digital processor operates, the local oscillation signal of the digital processor is not inputted through a line for supplying the first gain control voltage to the tuning circuit. Hence, the local oscillation signal does not interfere the operation of the analog processor.

[0034] In addition, if the digital television tuner receives an analog television signal, the power supply voltage is not supplied to the digital processor. Therefore, since the local oscillator in the digital processor does not operate, a local oscillation signal is not generated, and hence the local oscillation signal does not interfere the operation of the analog processor.

[0035] Furthermore, in the digital television tuner of the present invention, the tuning circuit has the first power supply terminal for supplying the power supply voltage to the tuning circuit, the second power supply terminal for supplying the power supply voltage to the analog processor, and second switching means. If the digital television tuner receives a digital television signal, the second switching means supplies the power supply voltage, supplied to the first power supply terminal, to the digital processor. Moreover, if the digital television tuner receives an analog television signal, not only the second switching means leads the power supply voltage, supplied to the first power supply terminal, to the second power supply terminal, but also the second switching means prevents the power supply voltage from being supplied to the digital processor. Therefore, power saving is planned.

Claims

1. A digital television tuner comprising:

a tuning circuit that has a gain control amplifier amplifying a television signal in a digital method and a television signal in an analog method, and a gain control terminal to which a gain control voltage for controlling the gain of the gain control amplifier is inputted, and outputs a first intermediate frequency signal based on the television signal in the digital method or a second intermediate frequency signal based on the television signal in the analog method; a digital processor outputting a first gain control voltage by processing the first intermediate frequency signal; an output terminal of an analog interme-

mediate frequency signal to which an analog processor outputting a second gain control voltage by processing the second intermediate frequency signal is connected; and a gain control voltage input terminal which is connected to the gain control terminal and receives the second gain control voltage from the analog processor, wherein first switching means is provided between the tuning circuit and the digital processor; wherein opening and closing means is provided between the gain control terminal and the digital processor; wherein, if the digital television tuner receives a television signal in the digital method, not only the first switching means inputs the first intermediate frequency signal, which is outputted from the tuning circuit, to the digital processor, but also the opening and closing means supplies the first gain control voltage to the gain control terminal; and wherein, if the digital television tuner receives a television signal in the analog method, not only the first switching means leads the second intermediate frequency signal, which is outputted from the tuning circuit, to the output terminal of an analog intermediate frequency signal, but also the opening and closing means prevents the first gain control voltage from being supplied to the gain control terminal.

2. A digital television tuner according to claim 1, wherein the digital television tuner prevents a power supply voltage from being supplied to the digital processor if the digital television tuner receives a television signal in the analog method.
3. A digital television tuner according to claim 2, wherein the tuning circuit has a first power supply terminal for supplying a power supply voltage to the tuning circuit, a second power supply terminal for supplying a power supply voltage to the analog processor, and second switching means; wherein, if the digital television tuner receives a television signal in the digital method, the second switching means supplies the power supply voltage, supplied to the first power supply terminal, to the digital processor; and wherein, if the digital television tuner receives a television signal in the analog method, not only the second switching means leads the power supply voltage, supplied to the first power supply terminal, to the second power supply terminal, but also the second switching means prevents the power supply voltage from being supplied to the digital processor.

FIG. 1

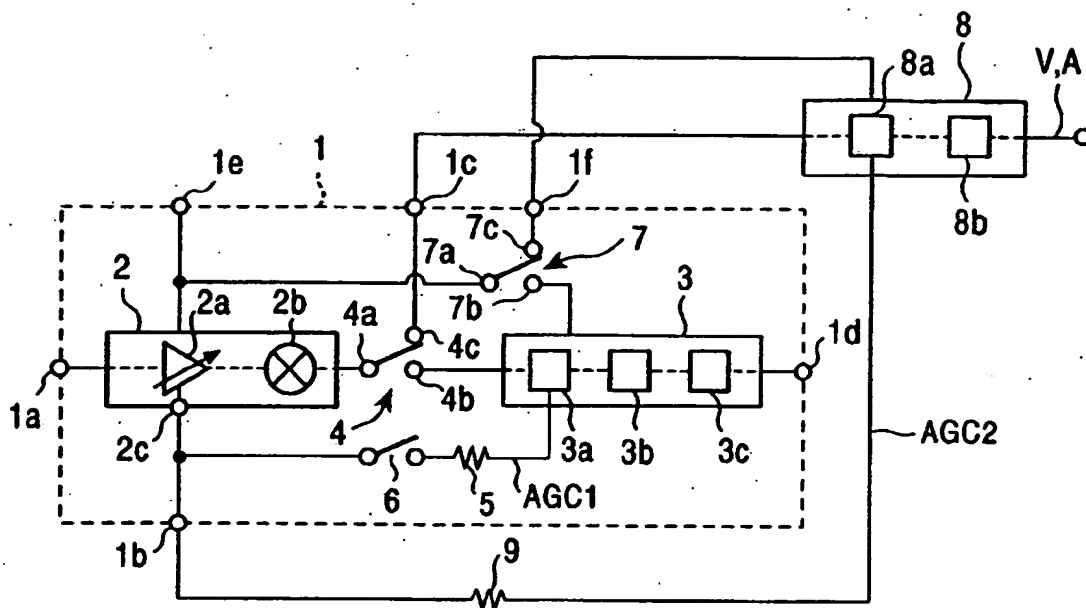
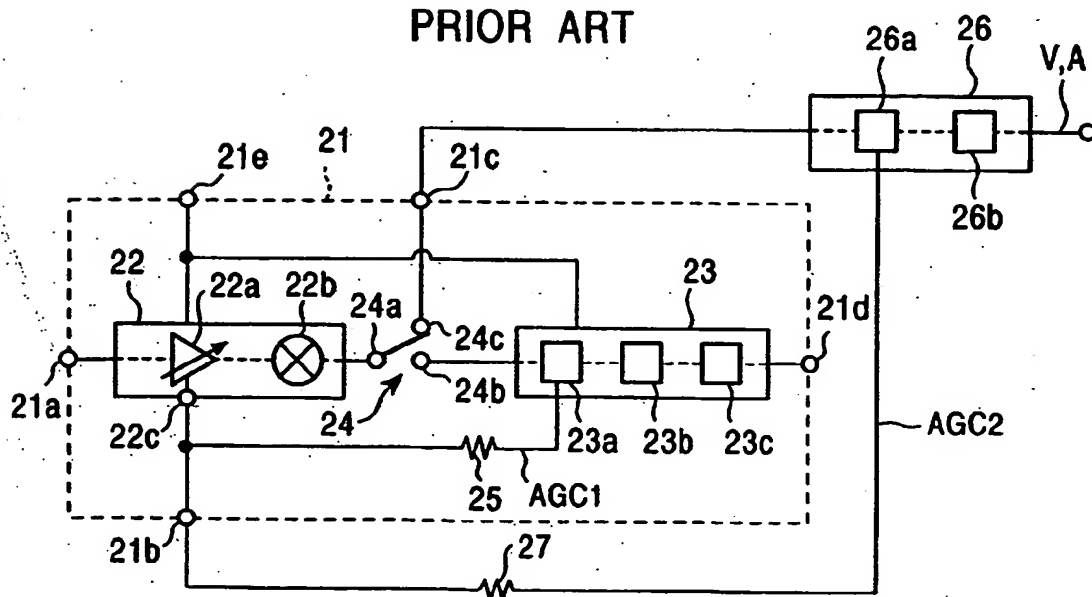


FIG. 2
PRIOR ART



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RCA89694	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/19115	International filing date (day/month/year) 13/07/2000	Priority date (day/month/year) 16/07/1999
International Patent Classification (IPC) or national classification and IPC H04N5/52		
Applicant THOMSON LICENSING S.A.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of ⁶7 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 14/02/2001	Date of completion of this report 23.10.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer D/L FUENTE DEL ..., P Telephone No. +49 89 2399 8608



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US00/19115

I. Basis of the report

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
Description, pages:

1-6 as originally filed

Claims, No.:

1-22 as originally filed

Drawings, sheets:

1/1 as received on 18/09/2000 with letter of 24/08/2000

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US00/19115

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1, 16
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-16
Industrial applicability (IA)	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations
see separate sheet

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US00/19115

10/031059

531 Rec'd PCT/PT 15 JAN 2002

Ad sectio VI:

US-A-5 982 457

EP-A-0 944 255

Ad sectio VIII:

1. Independent claim 1:
 - a. In the context of present application it appears that the term "television signal" is so broad that it does not appropriately define the entity, which is, according to the teachings of the description, meant to refer to (RF television signal, IF television signal, baseband television signal, digital television signal ?).
 - b. The amplifying step is not clear in the absence of any technical relationship between the control signal (in response to which the amplification is carried out) and the steps further defined in the claim. In other terms, the claim does not appear to properly define the "control signal". Furthermore, the steps further defined in the claim and relating to the conditional amplification of the received television signal are not clear. As a matter of fact the claimed method refers to "first and second signal levels" which are apparently predetermined (as the received signal level is compared to these two values). Therefore, the passage "if ... and said second signal level is greater than said first signal level" is not clear if the first and second signal levels are predetermined. If the claim is meant to define that the second signal is greater than the first signal a formulation such as "said second signal level being greater than said first signal level" would avoid any confusion.
2. Independent claim 16:
 - a. The objections raised against claim 1 also apply mutatis mutandis to claim 16.

Ad sectio V:

Reference is made to document D1: PATENT ABSTRACTS OF JAPAN vol. 1999, no. 09, 30 July 1999 (1999-07-30) & JP 11 098426 A (SAMSUNG ELECTRON CO LTD), 9 April 1999 (1999-04-09)

1. Independent claim 1:
 - a. D1 discloses a method for processing a received television signal comprising one

of a first type of television signal (analog broadcast signal) and a second type of television signal (digital broadcast signal), the method comprising: amplifying said received television signal (in tuner 20) in response to a control signal (provided by unit 28), where said amplifying occurs when said received television signal exceeds a first signal level (paragraph "solution" lines 10-11, decoded signal level) if said received television signal comprises the first type of television signal, said amplifying occurs when said received television signal exceeds a second signal (paragraph "solution" lines 10-11 decoded signal level) if received television signal comprises the second type of television signal, and said second signal level is greater than said first signal level (as a discrimination is made as to the nature of the signal- analogue or digital- to provide different AGC control signals the reference levels are also different thus one level is greater than the other).

- b. All the features recited in the claim appear to be known. Therefore, the subject-matter of the claim is not new (Article 33(2)PCT).
 - c. It should be noted that even if novelty of claim 1 is to be argued, based on minor differences between the features of this claim and those disclosed in D1, on unclearly defined features or even on features not defined in the claim, the subject-matter of claim 1 would not involve an inventive step (Article 33(3) PCT), having regard to the disclosure of D1.
2. Independent claim 16:
- a. The objections raised against claim 1 also apply mutatis mutandis to claim 16.
3. Dependent claims:
- a. Considering the teachings of D1 and the design competence of the skilled person, it does not appear that the preferred embodiments recited in the dependent claims add anything inventive (Article 33(3)PCT) to the claims on which they depend.

Ad section VII:

- a. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein (Rule 5.1 (a) (i) (ii)).
- b. Independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in a preamble (Rule

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US00/19115

6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

- c. The features of the claim/s are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).